

0066455

**SAF-B02-063
100 K Area - Full Protocol
FINAL VALIDATION PACKAGE**

COMPLETE COPY OF VALIDATION PACKAGE TO:

Jeanette Duncan (2 copies clipped)

MJF 8-16-05
~~INITIAL DATE~~

SDG H3218

SAF-B02-063

Waste Site: 100-K-56

RECEIVED
SEP 01 2005
EDMC

Date: 25 July 2005
To: Bechtel Hanford Inc. (technical representative)
From: TechLaw, Inc.
Project: 100K Area - Full Protocol - Waste Site 100-K-56 Deep Zone
Subject: Radiochemistry - Data Package No. H3218-LLI

INTRODUCTION

This memo presents the results of data validation on Data Package No. H3218-LLI prepared by Lionville Laboratory Inc. (LLI). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
J037K9	6/15/05	Soil	C	Gamma spectroscopy
J037L0	6/15/05	Soil	C	Gamma spectroscopy
J037L1	6/15/05	Soil	C	Gamma spectroscopy
J037L2	6/15/05	Soil	C	Gamma spectroscopy
J037L3	6/15/05	Soil	C	Gamma spectroscopy
J037L4	6/16/05	Soil	C	Gamma spectroscopy
J037L5	6/16/05	Soil	C	Gamma spectroscopy
J037L6	6/16/05	Soil	C	Gamma spectroscopy
J037L7	6/16/05	Soil	C	Gamma spectroscopy
J037L8	6/16/05	Soil	C	Gamma spectroscopy

(Samples J03CN5 & J03CN6 not validated per BHI)

Data validation was conducted in accordance with the Bechtel Hanford Incorporated (BHI) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, February 2005). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

DATA QUALITY PARAMETERS

- **Holding Times**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Preparation (Method) Blanks**

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the minimum detectable activity (MDA), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

Field (Equipment) Blank

No field blanks were submitted for analysis.

- **Accuracy**

Accuracy is evaluated from laboratory control sample (LCS) or blank spike sample (BSS) batch samples and spiked samples from the analytical batch. Measured activities are compared to the known added amounts. The acceptable LCS or BSS and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, or not qualified, depending on the activity of the individual sample. Results are rejected for LCS/BSS recoveries of less than 30% and tracer recoveries of less than 20%, and tracer recoveries of greater than 115% for detected results.

000002

All accuracy results were acceptable.

- **Laboratory Duplicates**

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the contract required detection limit (CRDL) and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD outside QC limits (38%), all thorium-228 results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

- Field Duplicates**

One set of field duplicate samples (J037L7/J037L8) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for potassium-40 was outside QC limits (41%). Under the BHI statement of work, no qualification is required. All other field duplicates were acceptable.

- **Detection Levels**

Reported analytical detection levels for undetected analytes are compared against the remaining waste sites RQLs to ensure that laboratory detection levels meet the required criteria. Sixteen analytes were reported above their RQL. Under the BHI statement of work, no qualification is required. All other reported results met the analyte specific RQL.

- **Completeness**

Data package No. H3218 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

000003

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to an RPD outside QC limits (38%), all thorium-228 results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Sixteen analytes were reported above their RQL. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 4, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, February 2005.

Appendix 1
Glossary of Data Reporting Qualifiers

000005

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U** - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ** - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J** - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R** - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR** - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

Appendix 2
Summary of Data Qualification

000007

RADIOCHEMISTRY DATA QUALIFICATION SUMMARY*

SDG: H3218	REVIEWER: TLI	PROJECT: 100-K-56	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Thorium-228	J	All	RPD

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

000009

00010

* - RQL exceeded

Laboratory applied non-detect qualifiers "U" have been included in this table to minimize potential miss-interpretation of results. All other qualifiers shown were applied during validation.

EBERLINE SERVICES / RICHMOND
 SAMPLE DELIVERY GROUP H3218

R506171-01

J037K9

DATA SHEET

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-01</u>	Client sample id <u>J037K9</u>	
Dept sample id <u>7845-001</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/15/05 09:50 1669 g</u>	
% solids <u>99.5</u>	Custody/SAF No <u>B02-063-080 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	15.2	0.84	0.52			GAM
Cobalt 60	10198-40-0	1.44	0.097	0.074	0.050		GAM
Cesium 137	10045-97-3	4.57	0.12	0.10	0.10		GAM
Radium 226	13982-63-3	0.520	0.16	0.21	0.10		GAM
Radium 228	15262-20-1	0.649	0.35	0.45	0.20		GAM
Europium 152	14683-23-9	31.4	0.44	0.35	0.10		GAM
Europium 154	15585-10-1	4.08	0.36	0.31	0.10		GAM
Europium 155	14391-16-3	U		0.40	0.10	U	GAM
Thorium 228	14274-82-9	0.598	0.094	0.14		T	GAM
Thorium 232	TH-232	0.649	0.35	0.45			GAM
Uranium 235	15117-96-1	U		0.41		U	GAM
Uranium 238	U-238	U		14		U	GAM
Americium 241	14596-10-2	U		0.85		U	GAM

100 K Area - Full Protocol

V
1/24/05

DATA SHEETS
 Page 1
SUMMARY DATA SECTION
 Page 12

000011

Lab id <u>EBERLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-02

J037L0

DATA SHEET

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-02</u>	Client sample id <u>J037L0</u>	
Dept sample id <u>7845-002</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/15/05 10:05 1578 g</u>	
% solids <u>99.4</u>	Custody/SAF No <u>B02-063-080 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FERS	TEST
Potassium 40	13966-00-2	15.0	0.71	0.35			GAM
Cobalt 60	10198-40-0	0.477	0.061	0.047	0.050		GAM
Cesium 137	10045-97-3	2.83	0.099	0.085	0.10		GAM
Radium 226	13982-63-3	0.525	0.11	0.13	0.10		GAM
Radium 228	15262-20-1	0.651	0.23	0.27	0.20		GAM
Europium 152	14683-23-9	10.2	0.20	0.15	0.10		GAM
Europium 154	15585-10-1	1.42	0.16	0.14	0.10		GAM
Europium 155	14391-16-3	U		0.23	0.10	U	GAM
Thorium 228	14274-82-9	0.619	0.059	0.082		T	GAM
Thorium 232	TH-232	0.651	0.23	0.27			GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		7.6		U	GAM
Americium 241	14596-10-2	U		0.50		U	GAM

100 K Area - Full Protocol

DATA SHEETS

Page 2

SUMMARY DATA SECTION

Page 13

000012

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-03

J037L1

DATA SHEET

SDG 7845	Client/Case no Hanford	SDG H3218
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id R506171-03	Client sample id J037L1	
Dept sample id 7845-003	Location/Matrix 100-K55-Piplns-Deep Zone SOLID	
Received 06/21/05	Collected/Weight 06/15/05 10:20 1523 g	
* solids 99.3	Custody/SAF No B02-063-080 B02-063	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.3	0.84	0.34			GAM
Cobalt 60	10198-40-0	0.841	0.075	0.053	0.050		GAM
Cesium 137	10045-97-3	21.6	0.25	0.12	0.10		GAM
Radium 226	13982-63-3	0.493	0.14	0.17	0.10		GAM
Radium 228	15262-20-1	0.601	0.22	0.28	0.20		GAM
Europium 152	14683-23-9	8.83	0.36	0.37	0.10		GAM
Europium 154	15585-10-1	1.18	0.25	0.23	0.10		GAM
Europium 155	14391-16-3	U		0.31	0.10	U	GAM
Thorium 228	14274-82-9	U		0.15		U	GAM
Thorium 232	TH-232	0.601	0.22	0.28			GAM
Uranium 235	15117-96-1	U		0.36		U	GAM
Uranium 238	U-238	U		9.4		U	GAM
Americium 241	14596-10-2	U		0.72		U	GAM

100 K Area - Full Protocol

Y
1/24/05

DATA SHEETS
Page 3
SUMMARY DATA SECTION
Page 14

000013

Lab id EBRNLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/28/05

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-04

J037L2

DATA SHEET

SDG 7845 Contact Melissa C. Mannion	Client/Case no Hanford Contract No. 630	SDG H3218
Lab sample id R506171-04	Client sample id J037L2	
Dept sample id 7845-004	Location/Matrix 100-K55-Piplns-Deep Zone SOLID	
Received 06/21/05	Collected/Weight 06/15/05 10:35 1512 g	
# solids 99.1	Custody/SAF No B02-063-080 B02-063	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	13.1	0.87	0.42			GAM
Cobalt 60	10198-40-0	0.224	0.053	0.053	0.050		GAM
Cesium 137	10045-97-3	5.40	0.14	0.092	0.10		GAM
Radium 226	13982-63-3	0.472	0.13	0.15	0.10		GAM
Radium 228	15262-20-1	0.690	0.26	0.32	0.20		GAM
Europium 152	14683-23-9	5.23	0.18	0.15	0.10		GAM
Europium 154	15585-10-1	0.568	0.15	0.17	0.10		GAM
Europium 155	14391-16-3	U		0.19	0.10	U	GAM
Thorium 228	14274-82-9	0.607	0.056	0.077		T	GAM
Thorium 232	TH-232	0.690	0.26	0.32			GAM
Uranium 235	15117-96-1	U		0.24		U	GAM
Uranium 238	U-238	U		8.4		U	GAM
Americium 241	14596-10-2	U		0.22		U	GAM

100 K Area - Full Protocol

7/24/05

DATA SHEETS

Page 4

SUMMARY DATA SECTION

Page 15

000014

Lab id EBRNLNE
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 06/28/05

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3218

R506171-05

J037L3

D A T A S H E E T

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-05</u>	Client sample id <u>J037L3</u>	
Dept sample id <u>7845-005</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/15/05 10:50</u>	<u>1528 g</u>
% solids <u>99.2</u>	Custody/SAF No <u>B02-063-080</u>	<u>B02-063</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	13.1	0.70	0.37			GAM
Cobalt 60	10198-40-0	0.650	0.061	0.049	0.050		GAM
Cesium 137	10045-97-3	28.6	0.25	0.11	0.10		GAM
Radium 226	13982-63-3	0.462	0.12	0.15	0.10		GAM
Radium 228	15262-20-1	0.656	0.23	0.29	0.20		GAM
Europium 152	14683-23-9	10.4	0.24	0.24	0.10		GAM
Europium 154	15585-10-1	1.78	0.20	0.17	0.10		GAM
Europium 155	14391-16-3	U		0.29	0.10	U	GAM
Thorium 228	14274-82-9	0.646	0.062	0.097		T	GAM
Thorium 232	TH-232	0.656	0.23	0.29			GAM
Uranium 235	15117-96-1	U		0.34		U	GAM
Uranium 238	U-238	U		8.3		U	GAM
Americium 241	14596-10-2	U		0.69		U	GAM

100 K Area - Full Protocol

*V
7/24/05*

DATA SHEETS
 Page 5
 SUMMARY DATA SECTION
 Page 16

000015

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-06

J037L4

DATA SHEET

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-06</u>	Client sample id <u>J037L4</u>	
Dept sample id <u>7845-006</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/16/05 08:15 1628 g</u>	
* solids <u>99.4</u>	Custody/SAF No <u>B02-063-081 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	11.0	0.52	0.30			GAM
Cobalt 60	10198-40-0	U		0.075	0.050	U	GAM
Cesium 137	10045-97-3	0.849	0.041	0.036	0.10		GAM
Radium 226	13982-63-3	0.344	0.062	0.066	0.10		GAM
Radium 228	15262-20-1	0.576	0.15	0.17	0.20		GAM
Europium 152	14683-23-9	0.506	0.084	0.094	0.10		GAM
Europium 154	15585-10-1	U		0.14	0.10	U	GAM
Europium 155	14391-16-3	U		0.077	0.10	U	GAM
Thorium 228	14274-82-9	0.638	0.052	0.051		J	GAM
Thorium 232	TH-232	0.576	0.15	0.17			GAM
Uranium 235	15117-96-1	U		0.13		U	GAM
Uranium 238	U-238	U		4.8		U	GAM
Americium 241	14596-10-2	U		0.047		U	GAM

100 K Area - Full Protocol

V
7/24/05

DATA SHEETS
 Page 6
 SUMMARY DATA SECTION
 Page 17

000016

Lab id <u>EBERLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3218

R506171-07

J037LS

D A T A S H E E T

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-07</u>	Client sample id <u>J037LS</u>	
Dept sample id <u>7845-007</u>	Location/Matrix <u>100-K55-PipIns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/16/05 08:30</u> <u>1582 g</u>	
% solids <u>99.2</u>	Custody/SAF No <u>B02-063-081</u> <u>B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	13.8	0.87	0.33			GAM
Cobalt 60	10198-40-0	U		0.036	0.050	U	GAM
Cesium 137	10045-97-3	0.115	0.041	0.049	0.10		GAM
Radium 226	13982-63-3	0.434	0.058	0.057	0.10		GAM
Radium 228	15262-20-1	0.597	0.19	0.19	0.20		GAM
Europium 152	14683-23-9	U		0.10	0.10	U	GAM
Europium 154	15585-10-1	U		0.13	0.10	U	GAM
Europium 155	14391-16-3	U		0.16	0.10	U	GAM
Thorium 228	14274-82-9	0.620	0.043	0.042		T	GAM
Thorium 232	TH-232	0.597	0.19	0.19			GAM
Uranium 235	15117-96-1	U		0.15		U	GAM
Uranium 238	U-238	U		5.2		U	GAM
Americium 241	14596-10-2	U		0.14		U	GAM

100 K Area - Full Protocol

K
7/24/05

DATA SHEETS
 Page 7
SUMMARY DATA SECTION
 Page 18

000017

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3218

R506171-08

J037L6

D A T A S H E E T

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-08</u>	Client sample id <u>J037L6</u>	
Dept sample id <u>7845-008</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/16/05 08:45 1560 g</u>	
% solids <u>99.5</u>	Custody/SAF No <u>B02-063-081 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	14.8	0.77	0.40			GAM
Cobalt 60	10198-40-0	1.97	0.091	0.047	0.050		GAM
Cesium 137	10045-97-3	3.28	0.10	0.086	0.10		GAM
Radium 226	13982-63-3	0.452	0.099	0.13	0.10		GAM
Radium 228	15262-20-1	0.648	0.23	0.30	0.20		GAM
Europium 152	14683-23-9	8.48	0.20	0.16	0.10		GAM
Europium 154	15585-10-1	1.31	0.20	0.19	0.10		GAM
Europium 155	14391-16-3	U		0.24	0.10	U	GAM
Thorium 228	14274-82-9	0.546	0.056	0.081		✓	GAM
Thorium 232	TH-232	0.648	0.23	0.30			GAM
Uranium 235	15117-96-1	U		0.26		U	GAM
Uranium 238	U-238	U		9.5		U	GAM
Americium 241	14596-10-2	U		0.51		U	GAM

100 K Area - Full Protocol

✓
7/24/05

DATA SHEETS
 Page 8
SUMMARY DATA SECTION
 Page 19

000018

Lab id	<u>EBRLINE</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
Form	<u>DVD-DS</u>
Version	<u>3.06</u>
Report date	<u>06/28/05</u>

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP H3218

R506171-09

J037L7

D A T A S H E E T

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG H3218
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-09</u>	Client sample id <u>J037L7</u>	
Dept sample id <u>7845-009</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/16/05 09:15 1592 g</u>	
* solids <u>98.6</u>	Custody/SAF No <u>B02-063-081 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	9.89	0.62	0.38			GAM
Cobalt 60	10198-40-0	U		<u>0.051</u>	0.050	U	GAM
Cesium 137	10045-97-3	0.924	0.057	0.051	0.10		GAM
Radium 226	13982-63-3	0.390	0.082	0.088	0.10		GAM
Radium 228	15262-20-1	0.613	0.17	0.20	0.20		GAM
Europium 152	14683-23-9	1.55	0.11	<u>0.12</u>	0.10		GAM
Europium 154	15585-10-1	U		<u>0.18</u>	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.11</u>	0.10	U	GAM
Thorium 228	14274-82-9	0.794	0.071	0.067			GAM
Thorium 232	TH-232	0.613	0.17	0.20			GAM
Uranium 235	15117-96-1	U		0.16		U	GAM
Uranium 238	U-238	U		6.5		U	GAM
Americium 241	14596-10-2	U		0.060		U	GAM

100 K Area - Full Protocol

K
7/24/05

DATA SHEETS
 Page 9
 SUMMARY DATA SECTION
 Page 20

000019

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-10

J037L8

DATA SHEET

SDG <u>7845</u>	Client/Case no <u>Hanford</u>	SDG <u>H3218</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R506171-10</u>	Client sample id <u>J037L8</u>	
Dept sample id <u>7845-010</u>	Location/Matrix <u>100-K55-Piplns-Deep Zone SOLID</u>	
Received <u>06/21/05</u>	Collected/Weight <u>06/16/05 09:15 1686 g</u>	
% solids <u>98.7</u>	Custody/SAF No <u>B02-063-081 B02-063</u>	

ANALYTE	CAS NO	RESULT pCi/g	2 σ MRR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	15.0	1.1	0.49			GAM
Cobalt 60	10198-40-0	U		0.046	0.050	U	GAM
Cesium 137	10045-97-3	U		0.045	0.10	U	GAM
Radium 226	13982-63-3	0.411	0.090	0.10	0.10		GAM
Radium 228	15262-20-1	0.673	0.17	0.18	0.20		GAM
Europium 152	14683-23-9	U		0.12	0.10	U	GAM
Europium 154	15585-10-1	U		0.16	0.10	U	GAM
Europium 155	14391-16-3	U		0.12	0.10	U	GAM
Thorium 228	14274-82-9	0.894	0.078	0.081		T	GAM
Thorium 232	TH-232	0.673	0.17	0.18			GAM
Uranium 235	15117-96-1	U		0.17		U	GAM
Uranium 238	U-238	U		6.7		U	GAM
Americium 241	14596-10-2	U		0.17		U	GAM

100 K Area - Full Protocol

M
7/24/05

DATA SHEETS
 Page 10
SUMMARY DATA SECTION
 Page 21

000020

Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

000021

Case Narrative

Page 1 of 1

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H3218 was composed of twelve solid (soil) samples designated under SAF No. B02-063 with a Project Designation of: 100 K Area – Full Protocol.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to BHI via e-mail on June 28, 2005.

2.0 ANALYSIS NOTES

2.1 Carbon-14 Analyses

No problems were encountered during the course of the analyses.

2.2 Nickel-63 Analyses

No problems were encountered during the course of the analyses.

2.3 Total Strontium Analyses

No problems were encountered during the course of the analyses.

2.4 Isotopic Uranium Analyses

No problems were encountered during the course of the analyses.

2.5 Isotopic Plutonium Analyses

No problems were encountered during the course of the analyses.

2.6 Americium-241 Analyses

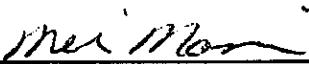
No problems were encountered during the course of the analyses.

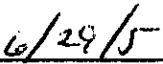
2.7 Gamma Spectroscopy

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."


Melissa C. Mannion
Senior Program Manager


Date

000022

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					B02-063-080	Page 1 of 1																																																																																																
Collector Coffman		Company Contact R Coffman Telephone No. 528-6409			Project Coordinator KESSNER, JH		Price Code 2D	Data Transport 7 Air Quality <input type="checkbox"/> 21 Days																																																																																																
Project Designation 100 K Area - Full Protocol		Sampling Location 100-K55-Pipelines - Deep Zone H3218 (7845)			SAF No. B02-063																																																																																																			
Ice Chest No. ERC 79041		Field Logbook No. EL-1572-3		COA RIKW552000		Method of Shipment FEDEX																																																																																																		
Shipped To EBERLINE SERVICES LIONVILLE		Offsite Property No. A050 250				Bill of Lading/Air Bill No. S6050SPC																																																																																																		
POSSIBLE SAMPLE HAZARDS/REMARKS																																																																																																								
Potentially Radioactive Special Handling and/or Storage 1 DEGREES COOL NO HEAT																																																																																																								
<table border="1"> <thead> <tr> <th>Preservation</th> <th>Cool 4C</th> <th>None</th> <th>None</th> <th>None</th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <th>Type of Container</th> <td>aG</td> <td>aG</td> <td>aG</td> <td>aG</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>No. of Container(s)</th> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>Volume</th> <td>125mL</td> <td>1000mL</td> <td>50mL</td> <td>50mL</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </thead> <tbody> <tr> <td colspan="2"></td> <td>Plutonium</td> <td>See item (1) in Special Instructions.</td> <td>Neptunium</td> <td>Strontium- 89.90 - Total</td> <td colspan="4"></td> </tr> <tr> <td colspan="2"></td> <td>Isotopic</td> <td>Plutonium</td> <td>Strontium- 89.90 - Total</td> <td colspan="4"></td> </tr> <tr> <td colspan="2"></td> <td>Plutonium</td> <td>Neptunium</td> <td>Sr, Nickel-63,</td> <td colspan="4"></td> </tr> <tr> <td colspan="2"></td> <td>Neptunium</td> <td>Uranium</td> <td>Carbon-14</td> <td colspan="4"></td> </tr> <tr> <td colspan="2"></td> <td>Uranium</td> <td></td> <td></td> <td colspan="4"></td> </tr> <tr> <td colspan="2"></td> <td>Actininium-241</td> <td></td> <td></td> <td colspan="4"></td> </tr> </tbody> </table>										Preservation	Cool 4C	None	None	None						Type of Container	aG	aG	aG	aG						No. of Container(s)	1	1	1	1						Volume	125mL	1000mL	50mL	50mL								Plutonium	See item (1) in Special Instructions.	Neptunium	Strontium- 89.90 - Total							Isotopic	Plutonium	Strontium- 89.90 - Total							Plutonium	Neptunium	Sr, Nickel-63,							Neptunium	Uranium	Carbon-14							Uranium									Actininium-241						
Preservation	Cool 4C	None	None	None																																																																																																				
Type of Container	aG	aG	aG	aG																																																																																																				
No. of Container(s)	1	1	1	1																																																																																																				
Volume	125mL	1000mL	50mL	50mL																																																																																																				
		Plutonium	See item (1) in Special Instructions.	Neptunium	Strontium- 89.90 - Total																																																																																																			
		Isotopic	Plutonium	Strontium- 89.90 - Total																																																																																																				
		Plutonium	Neptunium	Sr, Nickel-63,																																																																																																				
		Neptunium	Uranium	Carbon-14																																																																																																				
		Uranium																																																																																																						
		Actininium-241																																																																																																						
SAMPLE ANALYSIS																																																																																																								
000023																																																																																																								
Sample No.	Matrix *	Sample Date	Sample Time																																																																																																					
J037K9	SOIL	06/15/05	0950	X	X	X																																																																																																		
J037L0	SOIL		1005	X	X	X																																																																																																		
J037L1	SOIL		1020	X	X	X																																																																																																		
J037L2	SOIL		1035	X	X	X																																																																																																		
J037L3	SOIL		1050	X	X	X																																																																																																		
CHAIN OF POSSESSION																																																																																																								
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time	SPECIAL INSTRUCTIONS																																																																																																		
Coffman		6/15/05 1415	Ref. 1A		6/15/05 1415	(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)																																																																																																		
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time																																																																																																			
REF 1A		6/20/05 0900	6/20/05 0900																																																																																																					
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time																																																																																																			
FED EX		6/21/05	FED EX																																																																																																					
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time																																																																																																			
FED EX		06/21/05	Ref. 1A		06/21/05 9:30																																																																																																			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time																																																																																																			
Relinquished By/Removed From		Date/Time	Received By/Stored In		Date/Time																																																																																																			
LABORATORY SECTION		Received By		Title					Date/Time																																																																																															
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By					Date/Time																																																																																															

S=Soil
 SE=Sediment
 SO=Solid
 SI=Sedige
 W=Water
 O=Oil
 A=Air
 DS=Dust Solid
 DL=Dust Liquids
 T=Tissue
 WI=Wipe
 L=Liquid
 V=Vegetation
 X=Other

Bechtel Hanford Inc.

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B02-063-081

Page 1 of 1

Collector Coffman /TRICE	Company Contact R Coffman	Telephone No. 528-6409	Project Coordinator KESSNER, JH
Project Designation 100 K Area - Full Protocol	Sampling Location 100-K55-Pipelines - Deep Zone	H3218 (7845)	SAF No. B02-063
Ice Chest No. CRC 99041	Field Logbook No. EL-1572-3	COA RIKW552000	Air Quality <input type="checkbox"/>
Shipped To EBERLINE SERVICES LIONVILLE	Offsite Property No. A050250	Method of Shipment FEDEX	

2D

Data Turnaround

2X Days

Possibly Radioactive	Preservation Cool 4C	None	None	None				
Special Handling and/or Storage +DEGREES COOL-1/4A 1/2005	Type of Container aG	aG	aG	aG				
	No. of Container(s) 6/18	1	✓	1				
	Volume 125mL	1000mL	50mL	50mL				

POSSIBLE SAMPLE HAZARDS/REMARKS

Potentially Radioactive

Special Handling and/or Storage

+DEGREES COOL-1/4A 1/2005

000024

SAMPLE ANALYSIS

Sample No.	Matrix *	Sample Date	Sample Time	Cool 4C	None	None	None					
I037L4	SOIL	6/16/05	0815	X	X	X						B6
I037L5	SOIL		0830	X	X	X	X					C7
037L6	SOIL		0845	X	X	X	X					C8
037L7	SOIL		0915	X	X	X	X					C9
037L8	SOIL		0915	X	X	X	X					C9

CHAIN OF POSSESSION

Sign/Print Names

SPECIAL INSTRUCTIONS

Matrix *

Inquished By/Removed From [Signature]	Date/Time 6/16/05 0815	Received By/Stored In Ref 1B	Date/Time 6/16/05 12:00	(1) Gamma Spectroscopy (TCL List) [Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155]	S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Dust Solids DL=Dust Liquids T=Time W=Wipe L=Liquid V=Vegetation X=Other
Inquished By/Removed From [Signature]	Date/Time 6/16/05 0900	Received By/Stored In Ref 1B	Date/Time 6/16/05 0900		
Inquished By/Removed From [Signature]	Date/Time 6/16/05 0900	Received By/Stored In Ref 1B	Date/Time 6/16/05 0900		
Inquished By/Removed From [Signature]	Date/Time 6/21/05	Received By/Stored In Ref 1B	Date/Time 6/21/05 9:30		
Inquished By/Removed From [Signature]	Date/Time 6/21/05	Received By/Stored In Ref 1B	Date/Time 6/21/05 9:30		
Inquished By/Removed From [Signature]	Date/Time 6/20/05	Received By/Stored In Ref 1B	Date/Time 6/20/05	Personnel not available to Relinquish samples from 3728 Ref # on 6/20/05	

LABORATORY SECTION	Received By	Title	Date/Time
NAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					B02-063-083	Page 1 of 1	
Collector Coffman		Company Contact R Coffman			Telephone No. 528-6409	Project Coordinator KESSNER, JH		Price Code 2D	Data Turnaround
Project Designation 100 K Area - Full Protocol		Sampling Location 116-K-2 Trench Utility Crossing			H3218 (7845)	SAF No. B02-063		Air Quality <input type="checkbox"/>	21 Days 7 RC 0/1565
Ice Chest No. <i>GRC 99 041</i>		Field Logbook No. EL-1572-3		COA R116K22000		Method of Shipment FEDEX			
Shipped To <i>EBERLINE SERVICES LIONVILLE</i>		Offsite Property No. <i>A050 250</i>				Bill of Lading/Air Bill No. <i>SOE 087C</i>			
POSSIBLE SAMPLE HAZARDS/REMARKS									
Potentially Radioactive Special Handling and/or Storage +DEGREES COOL - NA 4P6005									
				Preservation	Cool <input checked="" type="checkbox"/>	None <input type="checkbox"/>	None <input type="checkbox"/>	None <input type="checkbox"/>	
				Type of Container	aG <input type="checkbox"/>	aG <input type="checkbox"/>	aG <input type="checkbox"/>	aG <input type="checkbox"/>	
				No. of Container(s)	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	1 <input type="checkbox"/>	
				Volume	125mL <input type="checkbox"/>	1000mL <input type="checkbox"/>	60mL <input type="checkbox"/>	60mL <input type="checkbox"/>	
				Chromium Hex 7196	See item (1) in Special Instructions <i>62805</i>	Isotopic Plutonium Isotopic Uranium Americium-241	Strontium-89,90 -- Total Sr; Nickel-63; Carbon-14		
SAMPLE ANALYSIS									
Sample No.	Matrix *	Sample Date	Sample Time						
03CN5	SOIL	<i>6/15/05</i>	0830	X	X	X	X		DEEP
03CN6	SOIL	<i>6/15/05</i>	0835	X	X	X	X		SHALLOW
CHAIN OF POSSESSION					Sign/Print Names				
linquished By/Removed From <i>1 AMV / CTRLE</i>	Date/Time <i>6/15/05 1415</i>	Received By/Stored In <i>Ref 1A</i>	Date/Time <i>6/15/05 1415</i>		SPECIAL INSTRUCTIONS				
linquished By/Removed From <i>REF 1A 6/20/05 0900</i>	Date/Time <i>6/20/05 0900</i>	Received By/Stored In <i>3/10/05</i>	Date/Time <i>6/20/05 0900</i>		(1) Gamma Spectroscopy (TCL List) (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Personnel not available to Relinquish samples from 3728 Ref # <i>1A 06 6/20/05</i>				
linquished By/Removed From <i>FED EX</i>	Date/Time <i>06/21/05</i>	Received By/Stored In <i>REF W</i>	Date/Time <i>06/21/05 9:30</i>						
linquished By/Removed From <i>FED EX</i>	Date/Time <i>06/21/05</i>	Received By/Stored In <i>REF W</i>	Date/Time <i>06/21/05 9:30</i>						
linquished By/Removed From <i>REF W</i>	Date/Time <i>06/21/05</i>	Received By/Stored In <i>REF W</i>	Date/Time <i>06/21/05 9:30</i>						
ABORATORY SECTION	Received By				Title				
NAL SAMPLE DISPOSITION	Disposal Method				Disposed By				

Matrix *
 S=Soil
 SE=Sediment
 SO=Solid
 SL=Slag
 W=Water
 O=Oil
 A=Air
 DS=Dust Solids
 DL=Dust Liquids
 T=Tissue
 W=Wipe
 L=Liquid
 V=Vegetation
 X=Other

Appendix 5

Data Validation Supporting Documentation

000026

APPENDIX A
RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT: <i>100K</i>	<i>100-K-56</i>			DATA PACKAGE: <i>H3218</i>	
VALIDATOR: <i>TLT</i>	LAB: <i>ER</i>			DATE: <i>7/23/05</i>	
			SDG: <i>H 3218</i>		
ANALYSES PERFORMED					
Gross Alpha/Beta	Strontium-90	Technetium-99	Alpha Spectroscopy	Gamma Spectroscopy	
Total Uranium	Radium-22	Tritium			
SAMPLES/MATRIX					
<i>J037L0 J037L1 J037L2 J037L3 J037L4</i>					
<i>J037L5 J037L6 J037L7 J037L8</i>					
<i>ns + N7 not validated Soil</i>					

1. Completeness N/A

Technical verification forms present? Yes No N/A

Comments:

2. Initial Calibration (Levels D, E) N/A

Instruments/detectors calibrated? Yes No N/A

Initial calibration acceptable? Yes No N/A

Standards NIST traceable? Yes No N/A

Standards Expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments:

3. Continuing Calibration (Levels D, E)

N/A

Calibration checked within required frequency? Yes No N/A

Calibration check acceptable? Yes No N/A

Calibration check standards traceable? Yes No N/A

Calibration check standards expired? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

4. Background Counts (Levels D, E) N/A

Background Counts checked within required frequency? Yes No N/A

Background Counts acceptable? Yes No N/A

Calculation check acceptable? Yes No N/A

Comments: _____

5. Blanks (Levels B, C, D, E) N/A

Method blank analyzed within required frequency? Yes No N/A

Method blank results acceptable? Yes No N/A

Analytes detected in method blank? Yes No N/A

Field blank(s) analyzed? Yes No N/A

Field blank results acceptable? Yes No N/A

Analytes detected in field blank(s)? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: _____

no FB

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) N/A

LCS /BSS analyzed within required frequency? Yes No N/A

LCS/BSS recoveries acceptable? Yes No N/A

LCS/BSS traceable? (Levels D,E) Yes No N/A

LCS/BSS expired? (Levels D,E) Yes No N/A

LCS/BSS levels correct? (Levels D,E) Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: _____

7. Chemical Carrier Recovery (Levels C, D, E) N/A

Chemical carrier added? Yes No N/A

Chemical recovery acceptable? Yes No N/A

Chemical carrier traceable? (Levels D, E) Yes No N/A

Chemical carrier expired? (Levels D, E) Yes No N/A
Transcription/Calculation errors? (Levels D, E) Yes No N/A
Comments: _____

8. Tracer Recovery (Levels C, D, E) N/A
Tracer added? Yes No N/A
Tracer recovery acceptable? Yes No N/A
Tracer traceable? (Levels D, E) Yes No N/A
Tracer expired? (Levels D, E) Yes No N/A
Transcription/Calculation errors? (Levels D, E) Yes No N/A
Comments: _____

9. Matrix Spikes (Levels C, D, E) N/A
Matrix spike analyzed? Yes No N/A
Spike recoveries acceptable? Yes No N/A
Spike source traceable? (Levels D, E) Yes No N/A
Spike source expired? Levels D, E) Yes No N/A
Transcription/Calculation Errors? (Levels D, E) Yes No N/A
Comments: _____

000030

10. Duplicates (Levels C, D, E) N/A

Duplicates Analyzed at required frequency? Yes No N/A

RPD Values Acceptable? Yes No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No N/A

Comments: th 228 - Tell 38%

11. Field QC Samples (Levels C, D E) N/A

Field duplicate sample(s) analyzed? Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split sample(s) analyzed? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable? Yes No N/A

Comments: FD k40 - 41% No FS or DS

12. Holding Times (All levels)

Are sample holding times acceptable? Yes No N/A

Comments: _____

000031

13. Results and Detection Limits (All Levels)..... N/A

Results reported for all required sample analyses?..... Yes No N/A

Results supported in raw data?(Levels D, E)..... Yes No N/A

Results Acceptable? (Levels D, E) Yes No N/A

Transcription/Calculation errors? (Levels D, E)..... Yes No N/A

MDA's meet required detection limits? Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments: 16 signs over

000032

Appendix 6

Additional Documentation Requested by Client

000033

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H3218

R506171-14

Method Blank

METHOD BLANK

SDG <u>7845</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> Contract No. <u>630</u>	SDG <u>H3218</u>
Lab sample id <u>R506171-14</u> Dept sample id <u>7845-014</u>	Client sample id <u>Method Blank</u> Material/Matrix _____ SAF No <u>B02-063</u>	<u>SOLID</u>

ANALYTE	CAS NO	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FICRS	TEST
Carbon 14	14762-75-5	8.95	8.2	13	50	U	C
Nickel 63	13981-37-8	-1.12	1.8	3.1	30	U	NI_L
Total Strontium	SR-RAD	-0.051	0.11	0.23	1.0	U	SR
Uranium 233/234	U-233/234	0	0.045	0.17	1.0	U	U
Uranium 235	15117-96-1	0	0.055	0.21	1.0	U	U
Uranium 238	U-238	0	0.045	0.17	1.0	U	U
Plutonium 238	13981-16-3	0	0.063	0.24	1.0	U	PU
Plutonium 239/240	PU-239/240	0	0.063	0.24	1.0	U	PU
Americium 241	14596-10-2	0.108	0.14	0.28	1.0	U	AM
Potassium 40	13966-00-2	U		0.22		U	GAM
Cobalt 60	10198-40-0	U		0.022	0.050	U	GAM
Cesium 137	10045-97-3	U		0.017	0.10	U	GAM
Radium 226	13982-63-3	U		0.037	0.10	U	GAM
Radium 228	15262-20-1	U		0.070	0.20	U	GAM
Europium 152	14683-23-9	U		0.045	0.10	U	GAM
Europium 154	15585-10-1	U		0.059	0.10	U	GAM
Europium 155	14391-16-3	U		0.028	0.10	U	GAM
Thorium 228	14274-82-9	U		0.020		U	GAM
Thorium 232	TH-232	U		0.070		U	GAM
Uranium 235	15117-96-1	U		0.049		U	GAM
Uranium 238	U-238	U		2.1		U	GAM
Americium 241	14596-10-2	U		0.019		U	GAM

100 K Area - Full Protocol

QC-BLANK 53336

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 9

000034

Lab id <u>EERLINE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/28/05</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3218

R506171-13

Lab Control Sample

LAB CONTROL SAMPLE

SDG 7845	Client/Case no Hanford	SDG H3218
Contact Melissa C. Mannion	Contract No. 630	
Lab sample id R506171-13	Client sample id Lab Control Sample	
Dept sample id 7845-013	Material/Matrix	SOLID
	SAF No B02-063	

ANALYTE	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2 σ ERR pCi/g	REC %	3 σ LMITS (TOTAL)	PROTOCOL LIMITS
Carbon 14	2090	44	15	50	C		2130	85	98	84-116	80-120
Nickel 63	210	6.8	3.7	30	NI_L		226	9.0	93	84-116	80-120
Total Strontium	10.1	0.52	0.21	1.0	SR		10.0	0.40	101	82-118	80-120
Uranium 233/234	19.2	1.9	0.85	1.0	U		18.6	0.74	103	82-118	80-120
Uranium 235	14.4	1.6	0.20	1.0	U		15.1	0.60	95	82-118	80-120
Uranium 238	20.4	2.0	0.81	1.0	U		20.2	0.81	101	82-118	80-120
Plutonium 238	25.9	3.0	0.28	1.0	PU		24.0	0.96	108	79-121	80-120
Plutonium 239/240	27.6	3.1	0.28	1.0	PU		26.4	1.1	104	80-120	80-120
Americium 241	21.0	2.6	0.32	1.0	AM		20.4	0.82	103	79-121	80-120
Cobalt 60	0.566	0.067	0.025	0.050	GAM		0.582	0.023	97	71-129	80-120
Cesium 137	0.604	0.064	0.050	0.10	GAM		0.591	0.024	102	71-129	80-120

100 K Area - Full Protocol

QC-LCS 53335

LAB CONTROL SAMPLES
Page 1SUMMARY DATA SECTION
Page 10

000035

Lab id EBERLINE
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 06/28/05

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H3218

R506171-15

J03CNS

DUPLICATE

SDG 7845		Client/Case no Hanford	SDG H3218
Contact Melissa C. Mannion		Contract No. 630	
DUPLICATE	ORIGINAL		
Lab sample id R506171-15	Lab sample id R506171-11	Client sample id J03CNS	
Dept sample id 7845-015	Dept sample id 7845-011	Location/Matrix 116-K-2 Trnch.Util.Cros. SOLID	
	Received 06/21/05	Collected/Weight 06/15/05 08:30 1603 g	
	% solids 95.9	Custody/SAF No B02-063-083 B02-063	

ANALYTE	DUPLICATE pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2 σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3 σ TOT	PROT LIMIT
Carbon 14	9.86	7.6	12	50	U	C	10.4	7.8	13	U	-		
Nickel 63	11.9	2.9	4.2	30		NI_L	10.7	2.5	3.5		11	55	
Total Strontium	2.47	0.26	0.19	1.0		SR	2.73	0.28	0.20		10	31	
Uranium 233/234	0.632	0.23	0.17	1.0		U	0.609	0.23	0.17		4	79	
Uranium 235	0.027	0.055	0.21	1.0	U	U	0	0.055	0.21	U	-		
Uranium 238	0.813	0.28	0.17	1.0		U	0.609	0.23	0.17		29	77	
Plutonium 238	0	0.059	0.23	1.0	U	PU	0	0.061	0.24	U	-		
Plutonium 239/240	0.149	0.12	0.23	1.0	U	PU	0.154	0.12	0.23	U	-		
Americium 241	0.122	0.12	0.23	1.0	U	AM	0	0.049	0.19	U	-		
Potassium 40	10.3	0.65	0.32			GAM	10.3	0.70	0.35		0	35	
Cobalt 60	U		0.062	0.050	U	GAM	U		0.064	U	-		
Cesium 137	6.79	0.13	0.065	0.10		GAM	6.62	0.14	0.067		3	32	
Radium 226	0.373	0.086	0.10	0.10		GAM	0.354	0.097	0.12		5	62	
Radium 228	0.665	0.15	0.16	0.20		GAM	0.600	0.17	0.20		10	62	
Europium 152	1.94	0.13	0.14	0.10		GAM	2.00	0.13	0.15		3	35	
Europium 154	U		0.18	0.10	U	GAM	U		0.25	U	-		
Europium 155	U		0.17	0.10	U	GAM	U		0.14	U	-		
Thorium 228	0.756	0.060	0.077			GAM	0.514	0.048	0.065		38	37	
Thorium 232	0.665	0.15	0.16			GAM	0.600	0.17	0.20		10	62	
Uranium 235	U		0.21		U	GAM	U		0.20	U	-		
Uranium 238	U		4.8		U	GAM	U		5.6	U	-		
Americium 241	U		0.42		U	GAM	U		0.18	U	-		

100 K Area - Full Protocol

QC-DUP#11 53337

DUPLICATES

Page 1

SUMMARY DATA SECTION

Page 11

000036

Lab id EBERLINE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-DUP
 Version 3.06
 Report date 06/28/05